SME 100

H.264 STREAMING MEDIA ENCODER

Advanced Video Processing for High Performance AV Streaming

- **Streams DVI, RGB, HDTV, and video signals with audio over IP networks**
- **Supports input signal resolutions up to 1920x1200, including HDTV 1080p/60**
- **Available in two models supporting streaming at SD or HD resolutions**
  - HD model streams at selectable resolutions from 166x120 up to HDTV 720p/30 and 1080p/30
  - SD model streams at selectable resolutions from 166x120 to 720x576
- **Auto Input Format Detection**

Extron® Electronics
INTERFACING, SWITCHING AND CONTROL

Introduction

The Extron **SME 100** is designed specifically for pro AV applications and features an integrated three-input switcher with audio, plus buffered loop-throughs for simplified integration into AV systems. It is a live streaming media encoder that accepts DVI, RGB, HDTV, and standard definition signals for delivering media over an IP network. The SME 100 employs standards-based H.264 / MPEG-4 AVC encoding to create an IP stream that can easily be decoded and viewed on desktop or laptop PCs. High performance Extron signal processing scales and optimizes video input signals for the intended viewing application. Encoding controls also provide adjustments for bit rate and quality. The SME 100 significantly expands AV system capabilities by extending AV signals over networks.

Enhance AV Capabilities With Streaming

Use of a standards-based encoder provides an open technology environment that provides a high degree of interoperability and the opportunity to stream into platforms supporting the H.264 / MPEG-4 AVC standard. Live H.264 media streaming can enhance AV system functionality in many ways. Helpdesk staff can view live content at their PCs and actively monitor AV systems. Presentation overflow rooms can easily be added by streaming to a PC connected to a projector or flat-panel display. Corporate and educational facilities can simplify their AV system designs by installing DVD players, satellite receivers, and other sources in a central location, streaming to individual rooms as needed. The SME 100 can also be used for broad media delivery across the Internet when used with a media server and Content Delivery Network - CDN.

H.264 / MPEG-4 AVC Encoding

The SME 100 employs the High Profile of the H.264 / MPEG-4 AVC compression standard, which can support compatibility on many different platforms including desktop or laptop PCs. SME 100 streams can easily be viewed on PCs using Web browsers and software media players such as VLC® or QuickTime®. If necessary, the SME 100 will automatically deliver an H.264 streaming decoder application to a newly connected PC, enabling presentation of streamed AV content. All that is needed to initiate streaming is a connection to the IP address of the SME 100, or a simple Web page created by AV staff or IT administrators.

Designed for Pro AV Integration

A host of familiar, integrator-friendly features make the SME 100 ideal for professional AV applications. The integrated three-input switcher accepts common video signal formats together with stereo audio, from DVI to analog RGB and composite video. The universal video input can accept multiple analog formats and automatically detect between them. Each input has a buffered loop-through, so that the SME 100 can be integrated into a new or legacy system without the need for additional AV equipment such as distribution amplifiers. The SME 100 also includes audio breakaway so that any connected audio source can be assigned to the streamed output.

Overview

Multiple Control Features

The SME 100 can be quickly configured from the front panel or through the USB port. It can also be controlled using a Web browser to access embedded HTML pages, or through Ethernet or serial RS-232 ports. Video streams can be viewed live from the Extron embedded HTML interface while making encoder adjustments. Encoder control settings can be saved into presets so the user can quickly switch between various streaming profiles based on resolution or bit rates for different applications. The SME 100 also includes several predefined presets for common streaming applications.

Image Quality

The SME 100 accepts standard definition and high resolution video signals up to WUXGA 1920x1200 and HDTV 1080p/60. The same high performance video processing in Extron's flagship scalers and signal processors is used in the SME 100 to optimize video and computer graphic input signals, with high quality upscaling and downscaling to deliver the best possible image presentation for various AV streaming requirements.

Compression and Encoding Control

Several user controls are available to adjust the quality of the AV encoding. These include video resolution, video bit rate, frame rate, bit rate control, and audio bit rate. The Group of Pictures - GOP length can also be adjusted, allowing the user to specify use of fewer or more frames in the compression process. The bit rate can be set as variable or constant, from rates well below 1 Mbps up to 10 Mbps, to meet network bandwidth or image quality requirements.

VN-MATRIX®

VN-Matrix® products utilizing the Extron PURE3® Codec are available for streaming high resolution video and computer graphics real-time in low-delay collaborative and interactive applications such as:

Control Rooms: For broadcast, surveillance, command and control, and monitoring

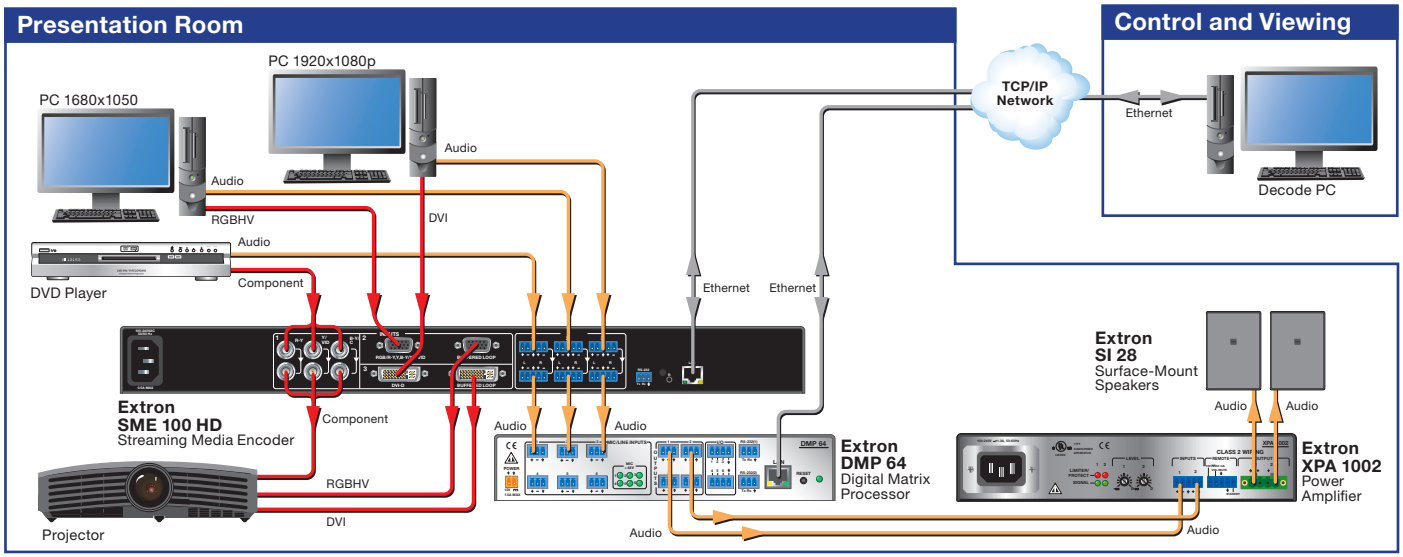
Training and Education: For real-time visualization and simulation environments

Contribution & Collaboration: For broadcast, post-production, scientific, military, product design, oil and gas exploration

Available in Two Models

The SME 100 is available in two models. Both products support standard definition and high resolution video signals up to WUXGA 1920x1200 and HDTV 1080p/60. Available streaming resolutions vary between the two products.

Model	Streamed Output Resolution
SME 100 HD	Selectable from 166x120 up to HDTV 720p/30 and 1080p/30
SME 100 SD	Selectable from 166x120 to 720x486 or 720x576



Presentation system with remote monitoring

Input Features

Supports input signal resolutions up to 1920x1200, including HDTV 1080p/60

The SME 100 supports a wide range of input resolutions, from standard definition up to the high resolutions commonly used for computer-video and HDTV.

Auto Input Format Detection

For the universal video input, the SME 100 can detect the incoming signal format, automatically reconfiguring itself to provide the appropriate decoding and signal processing. This feature can reduce the number of required outputs for a matrix switcher, lowering system cost while improving manageability.

Auto-Image™ setup

When activated, the unit automatically analyzes the incoming video signal and then automatically adjusts sizing, centering, and filtering to optimize image quality. This can save time and effort in fine tuning displayed images.

Auto Input Memory

When activated, the SME 100 automatically stores size, position, and picture settings based on the incoming signal. When the same signal is detected again, these image settings are automatically recalled from memory.

EDID Minder®

Automatically manages EDID - Extended Display Identification Data communication with connected DVI and VGA input sources. EDID Minder® ensures that all sources power up correctly and reliably output content, whether or not they are actively connected to the display device through the input loop-throughs.

Picture controls

Multiple image adjustments are available including brightness, contrast, color, tint, and detail, as well as horizontal and vertical positioning, sizing, and zoom. A total of 16 user memory presets are available for each input to store all image settings.

Advanced deinterlacing

The SME 100 provides optimized image quality through advanced motion adaptive deinterlacing for 1080i and standard definition signals from sources including cable or satellite set-top boxes.

Quad standard video decoding

The SME 100 uses a digital, five-line adaptive comb filter to decode NTSC 3.58, NTSC 4.43, PAL, and SECAM for integration into systems worldwide.

Integrated three-input AV switcher

The SME 100 accepts commonly used video signal formats together with stereo audio, from DVI to analog RGB and composite video. The universal video input can accept a variety of analog formats and automatically detect between them.

Buffered input loop-throughs for video and audio

Each input has a buffered loop-through, so that the SME 100 can be integrated into a new or legacy system without the need for additional AV equipment such as distribution amplifiers.

Audio switching

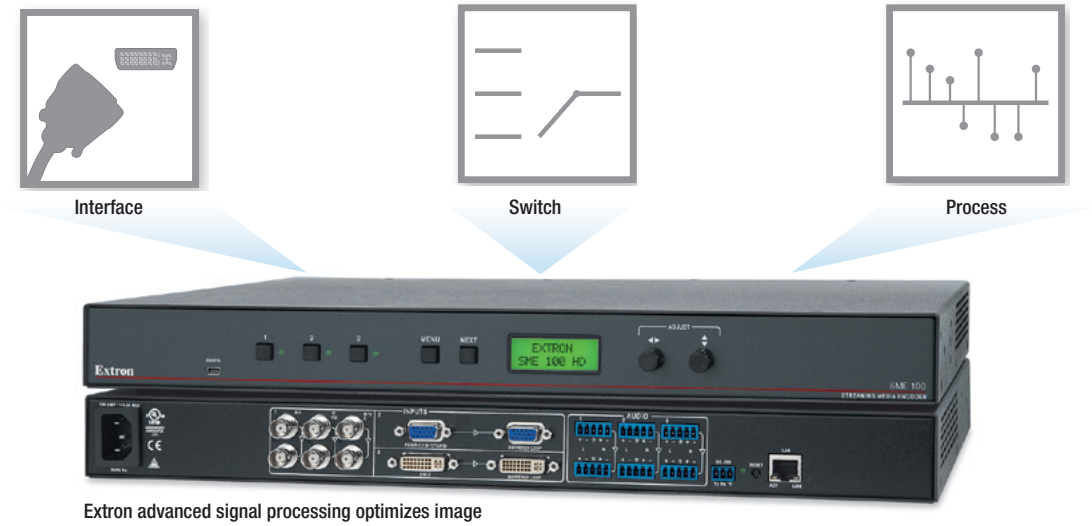
The SME 100 features audio switching for three stereo balanced or unbalanced input sources with buffered loop-throughs.

Audio breakaway

The SME 100 can break an audio signal away from its corresponding video signal, allowing it to be encoded for streaming with a different video input.

Audio input gain and attenuation

Gain or attenuation can be adjusted for each input to eliminate noticeable differences when switching between sources, or adjusting audio levels for the output stream.



Extron advanced signal processing optimizes image quality for a wide variety of AV input signals.

Output Features

Standards-based H.264 / MPEG-4 AVC video compression

The SME 100 employs the High Profile of the H.264 / MPEG-4 AVC compression standard which provides high quality encoding, and can be interfaced with compatible media players or decoded on PCs using software media players such as VLC or QuickTime.

DVI, RGB, HDTV, and standard definition video upscaling and downscaling

DVI, RGB computer-video, high definition video, and standard definition video sources can all be scaled to a range of defined streaming resolutions. The SME 100 features an advanced scaling engine that preserves image quality when upscaling or downscaling an input signal.

Available in two models streaming at SD or HD resolutions

The SME 100 is available in two models: the SME 100 HD and the SME 100 SD, which stream at various resolutions optimized for specific displays or applications.
The SME 100 SD streams at selectable resolutions from 166x120 to 720x576.
The SME 100 HD streams at selectable resolutions from 166x120 up to HDTV 1080p/30. Frame rates can be adjusted from 30 fps to 1 fps.

Aspect ratio control

The aspect ratio of the streamed output can be controlled by selecting a FILL mode, which provides a full screen output, or a FOLLOW mode, which preserves the original aspect ratio of the input signal.

Encoding quality controls

Several user controls are available to adjust AV encoding quality, including video resolution, video bit rate, frame rate, constant or variable bit rate control, GOP length, and audio bit rate.

Streaming presets for quick recall of streaming profiles based on target resolution or bit rates

The SME 100 provides 16 presets for saving encoder control settings, so the user can quickly switch between various streaming profiles based on resolution or bit rates. Eight of these presets are predefined for common streaming applications.

Glitch-free switching

Switching is glitch-free with a cut transition. Presentations are enhanced by eliminating distracting visual jumps, glitches, and distortion commonly experienced when switching between computer and video sources.

Internal test patterns for calibration and setup

The SME 100 offers 15 test patterns as well as on-screen display - OSD data overlay including Time Stamp, average bit rate, frame rate, time and date and system information to aid in calibration and setup of the encoder.

AAC audio encoding

Variable audio compression is available to support different streaming bit rate requirements.

User-adjustable audio delay

Audio delay can be adjusted to adapt the streamed output to different network conditions.

Ethernet monitoring and control

The SME 100 is controllable over the Ethernet connection supporting configuration and real-time management from Extron or third party control systems.

Embedded preview window

The SME 100 provides an intuitive Web interface with an embedded video window to view the live stream as well as source input and encoding adjustments.

Embedded Web page HTML

The SME 100 Web interface includes basic HTML code that can be copied and pasted to quickly create Web pages for viewing SME 100 AV streams on networked PCs.

RS-232 control port

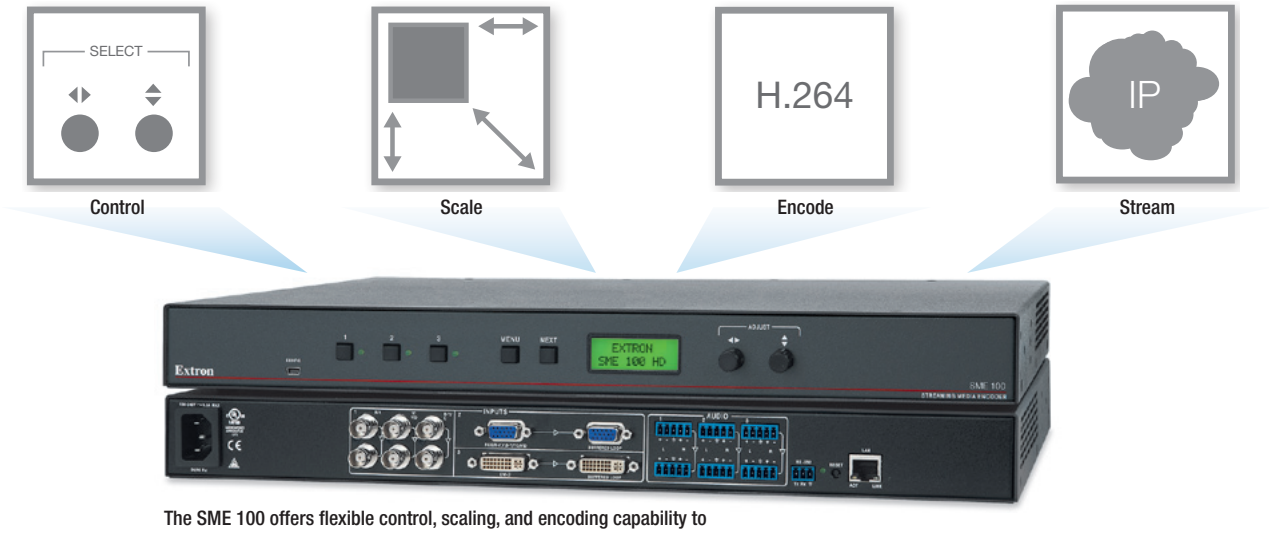
Using serial commands, the SME 100 can be controlled and configured via the Extron Windows®-based control program, or integrated into a control system. Extron products use the SIS™ - Simple Instruction Set command protocol, a set of basic ASCII code commands that allow for quick and easy programming.

Power Save Mode

The SME 100 can be set to automatically mute video and sync output to the display device when no active input signal is detected. This allows a display, connected to the input loop-throughs, to automatically enter into standby mode to save energy and enhance lamp or panel life.

Low Power Mode

The SME 100 can be configured to operate in a low power mode when an active signal input is not present.



The SME 100 offers flexible control, scaling, and encoding capability to support a wide range of streaming devices and destinations.

Overview

Integrated three-input AV switcher
The SME 100 accepts common video signal formats from DVI to analog RGB and composite video, together with stereo audio.

Auto-Image™ setup
Quickly set up new sources such as presentation laptops.

Standards-based H.264 / MPEG-4 AVC encoding
Ensures compatibility for decoding on different platforms including PCs.

User-friendly interface
An intuitive LCD interface, direct access buttons, and precise rotary controls simplify system setup and operation.

SME 100 front panel

High performance video processing
Optimizes low and high resolution input signals to deliver the best possible image quality for AV streaming, from resolutions as low as 166x120 to HDTV 1080p.

Picture controls
Brightness, contrast, color, tint, detail, position, size, and zoom can be adjusted to enhance picture quality and improve coding efficiency.

Test patterns
Video and audio test patterns, including on-screen data overlay, can be used to test, monitor, and troubleshoot network streaming.

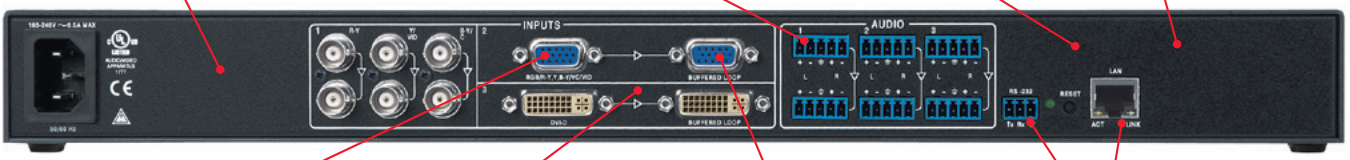
Streaming presets
16 presets are available for saving encoder control settings, so the user can quickly switch between various streaming profiles based on resolution or bit rates for different applications.

High quality scaling
DVI, RGB, and video input signals can be upscaled or downscaled to match the optimum resolution for a variety of displays at selectable resolutions from 166x120 to 720x576 for the SME 100 SD or up to 720p and 1080p for the SME 100 HD.

Audio breakaway
Provides the capability to assign any audio input to the AV encoder.

Encoding quality controls
Several user controls are available to adjust the encoded AV output, such as video resolution, bit rate, and frame rate.

Embedded HTML Web interface
The embedded HTML interface provides intuitive system configuration and user adjustment of encoder settings.



SME 100 rear panel

Universal analog video input
Accepts and automatically detects a variety of video signal types, simplifying integration with a matrix switcher.

EDID Minder®
Automatically manages EDID communication with connected DVI and VGA inputs, ensuring continuous, reliable output as sources are switched.

Buffered input loop-throughs
Allow for easy integration into AV systems without the need for additional equipment.

Ethernet and RS-232 control
Remote control and monitoring plus real-time adjustment of AV encoding.

Control Software

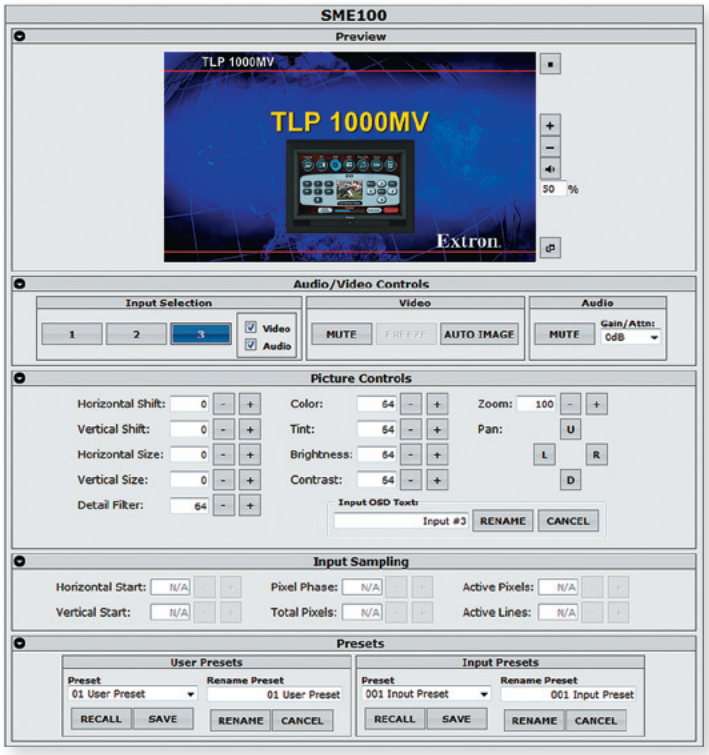
SME 100 Control Software

Embedded Control Software

The SME 100 can be fully configured and controlled using the embedded control software, which can be accessed using a Web browser on a PC over a network. The software allows for system setup and configuration, as well as management and adjustment of AV streaming. With a live video preview window available within the embedded software, AV or IT staff can remotely monitor and make adjustments to media streams in real-time.

AV Integration Controls At-a-Glance

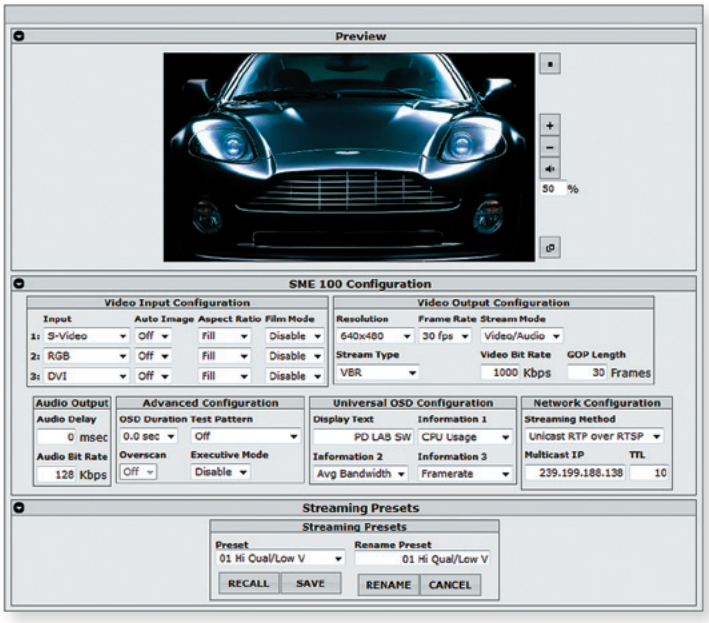
The SME 100 embedded HTML interface includes a Web page that provides all the essential control and configuration options for optimizing the AV input signals, including source switching, audio and video muting, audio breakaway switching, and picture controls. Clicking the Auto-Image button quickly sets up a newly connected laptop or other VGA source. For precise calibration of analog RGB sources, pixel controls are also available. Picture control and pixel adjustments can be saved into 16 available user presets with customizable names. The SME 100 also automatically stores and recalls settings based on the incoming signal frequency. Additional input presets are available for setting up the universal analog video input to receive various signals from a switcher or matrix switcher.



SME 100 signal input controls

Quick Access to Streaming Controls

Another Web page provides all of the options for setting the attributes and quality of the streamed AV output. These include input source selection, video resolution, frame rate, bit rate control, video bit rate, GOP length, and streaming method. Audio delay and bit rate can also be adjusted. For testing and diagnostic purposes, the user can also bring up a video or audio test pattern, including the on-screen display which provides real-time information relevant to the streamed media. Streaming settings can be saved into user presets, which can quickly be recalled to set the SME 100 for a specific AV streaming mode or application.

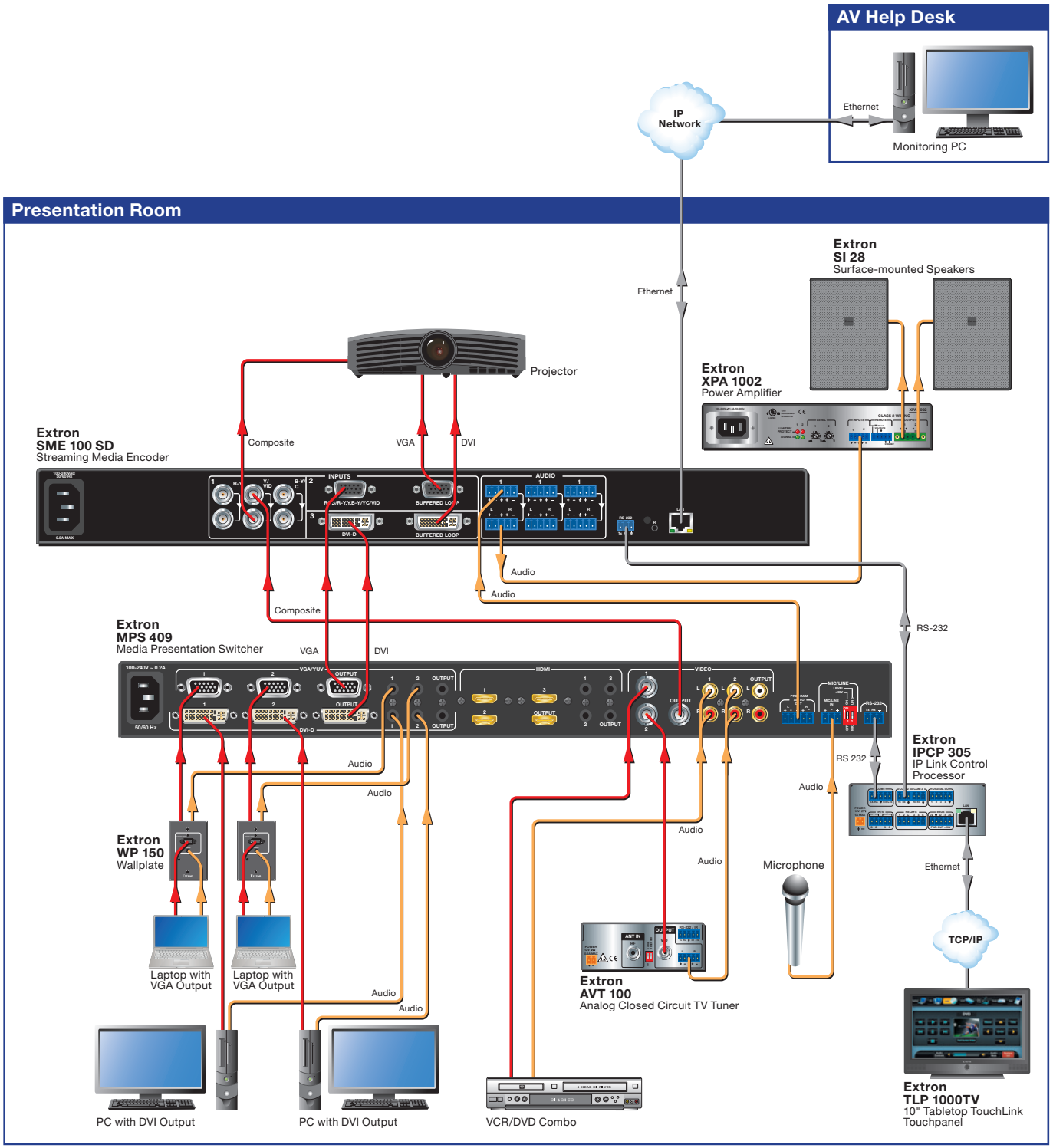


SME 100 encoding configuration

Applications

AV Presentation and Remote Room Monitoring

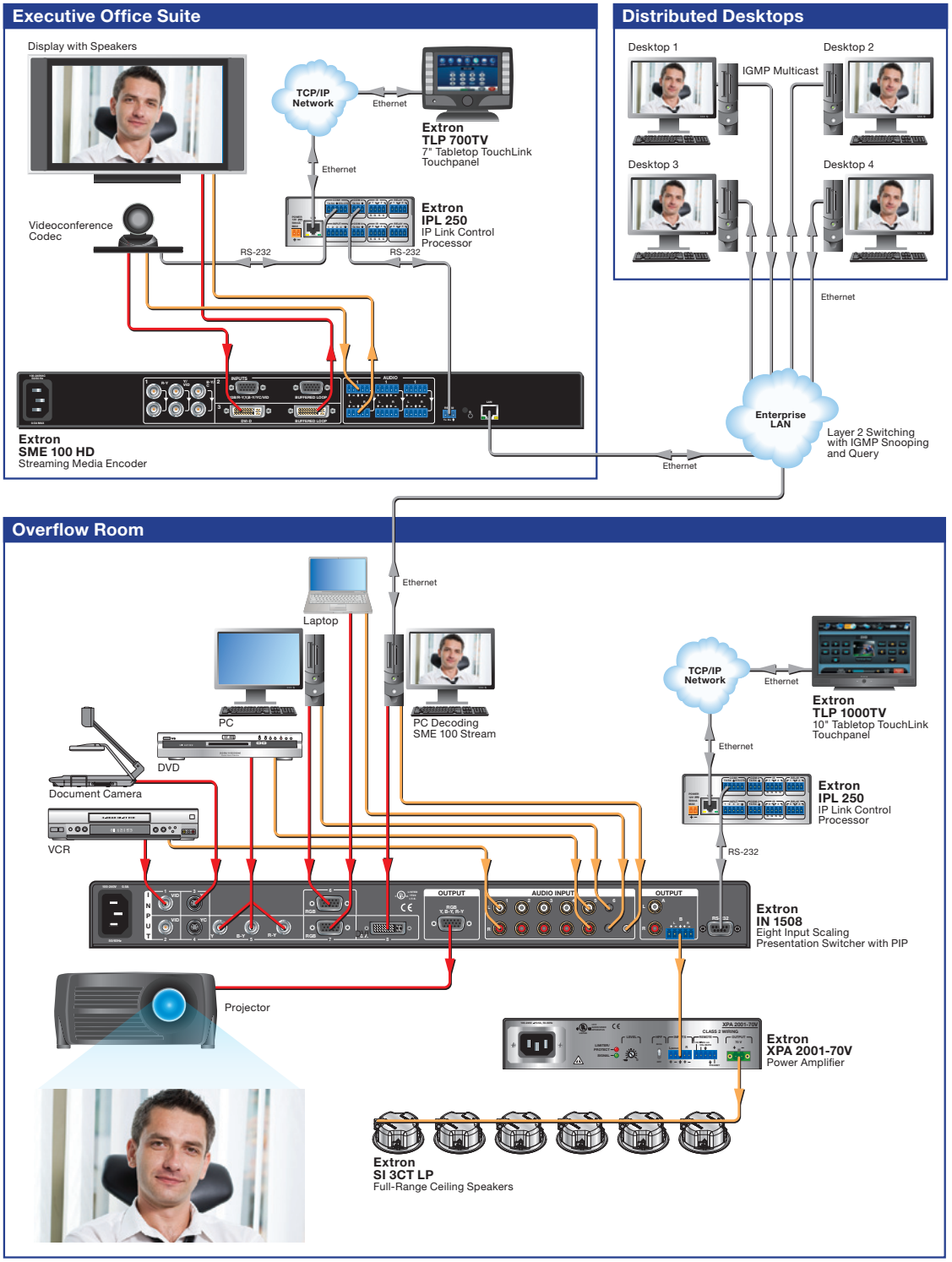
Many organizations with presentation environments want the ability to monitor and support live presentation sessions from a remote location, such as a helpdesk. Adding video streaming capability to presentation systems conveniently allows staff to view live on-screen content on their PCs. This can be accomplished by adding an SME 100 SD to an existing AV presentation system between a switcher, such as the Extron MPS 409, the projector, and audio system. The input loop-throughs of the SME 100 SD allow it to be installed without affecting AV system functions. An integrated three-input switcher on the SME 100 SD enables selection between the DVI, VGA, or standard definition outputs from the MPS 409 presentation switcher for streaming.



Applications

Presentation or Videoconference Overflow

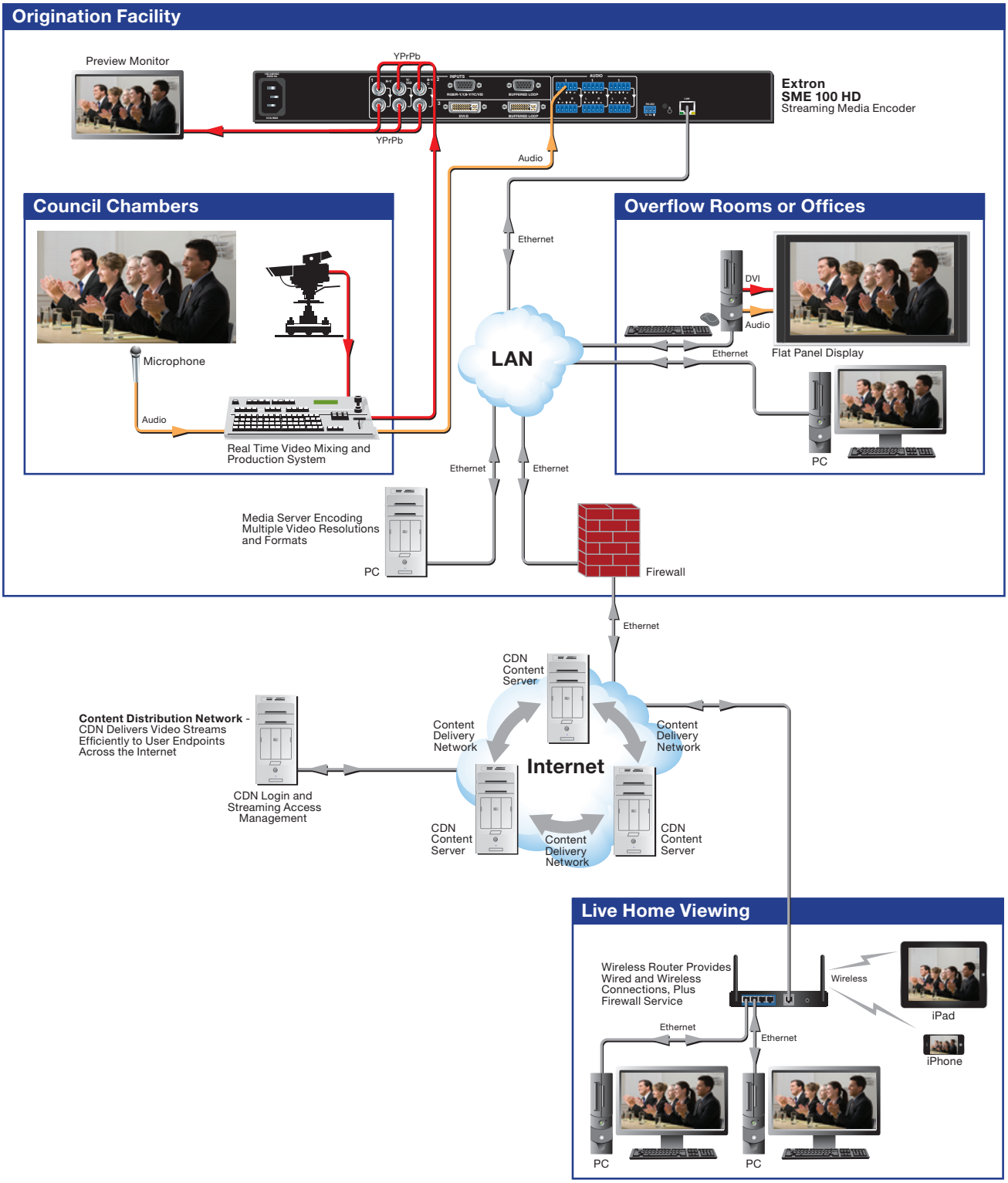
Corporate organizations periodically deliver live announcements to employees such as strategic updates or quarterly business results. Reaching everyone in the company is challenging, however, due to the fact that companies often have just a few presentation rooms with videoconference equipment. The SME 100 HD can be used to quickly add overflow rooms or extend presentations to employee desktops. All that is required is to interface the SME 100 HD to the DVI and audio outputs of the videoconference codec, and loop them through to the display and sound system. On networks which can support scalability with multicast streaming traffic, networked PCs can be quickly set up for presentation access by creating a basic Web page to connect to the SME 100 HD.



Applications

Live Streaming Over the Internet for Local Governments

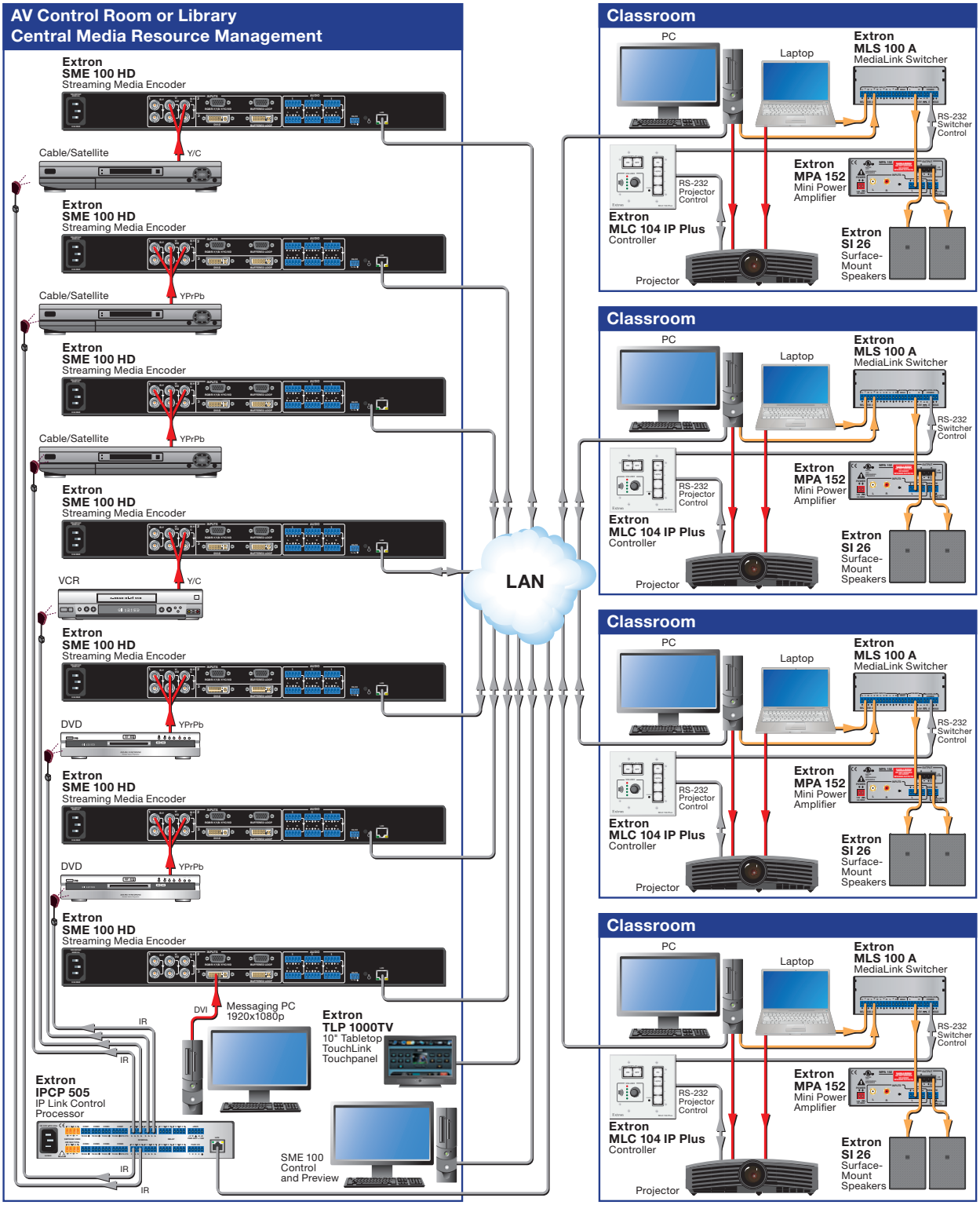
Many local state and city governments would like to make meeting or committee sessions easily accessible to their citizens over the Internet. Live or on-demand streaming of these sessions will make it convenient for them to become more aware and involved with the political process. An SME 100 HD can be used to stream the output from the broadcast video production and deliver master 720p streamed video to a media server, which in turn streams video to multiple areas within the building, and a Content Delivery Network - CDN service located outside the facility. The CDN manages broad delivery of the media to users over the Internet.



Applications

Enterprise Broadcast

Educational institutions or corporations with large enterprise operations often have DVD players, VCRs, PCs, and other source devices distributed among the AV systems in individual rooms. Because these sources may only be used occasionally, an alternative to duplicating them throughout the facility is to consolidate them into a bank of media sources in a central AV control room. An SME 100 HD can be interfaced to each source, streaming content to one or many PCs integrated into classroom AV systems when required. The video sources can be streamed at up to 1080p HD resolution and be presented on large projection screens.



Specifications

VIDEO INPUT AND LOOP-THROUGH

Number/signal type	1 RGBHV, RGBS, RGsB, RGBcvS, component video (Y, R-Y, B-Y; interlaced, progressive, HD) S-video, or composite video, with buffered loop-through 1 component video (Y, R-Y, B-Y; interlaced, progressive, HD) S-video, or composite video, with buffered loop-through 1 single link DVI-D with buffered loop-through
Connectors	2 female 15-pin HD: RGB, component video, S-video, composite video input and loop-through 2 x 3 female BNC: component video, S-video, composite video input and loop-through 2 x 2 female BNC: S-video, composite video input and loop-through 2 female DVI-I: DVI-D input and loop-through
Horizontal frequency	15 kHz to 100 kHz
Vertical frequency	50 Hz to 120 Hz
Resolution range	640x480 to 1600x1200, 1920x1200 (reduced blanking), 480i, 480p, 576i, 576p, 720p, 1080i, and 1080p, digitized pixel for pixel; higher resolutions are undersampled.

VIDEO PROCESSING

Digital sampling	30 bit, 10 bits per color, 13.5 MHz standard (low resolution video), 165 MHz standard (RGB, YUVp, DVI)
Colors	1 billion, 1024 per color channel
Compression	H.264/AVC (ITU-T H.264, ISO/IEC 14496-10:2003 MPEG-4 Part 10, High Profile), 4:2:0, 8 bits per color
Bit rate	200 kbps to 10 Mbps
Bit rate control	Selectable (variable or constant)

VIDEO OUTPUT

Scaled resolution	
SME 100 SD	166x120 (QSIF), 176x144 (QCIF), 320x240 (SIF), 352x288 (CIF), 480x320, 480x360, 640x360, 640x480, 720x480, 720x576
SME 100 HD	166x120 (QSIF), 176x144 (QCIF), 320x240 (SIF), 352x288 (CIF), 480x320, 480x360, 640x360, 640x480, 720x480, 720x576, 800x480, 800x600, 1024x768, 720p, 1080p
Frame rate	Up to 30 fps for all output rates
Formats	H.264/AVC (ITU-T H.264, ISO/IEC 14496-10:2003 MPEG-4 Part 10, AVC, High Profile)

SYNC

Input type	RGBHV, RGBS, RGsB, RGBcvS, and component video (tri-level or bi-level)
Standards	NTSC, PAL MPEG-4/H.264 (ITU-T H.264, ISO/IEC 14496-10:2003 MPEG-4 Part 10, AVC)

AUDIO INPUT WITH LOOP-THROUGH

Number/signal type	3 stereo, balanced or unbalanced, with loop-through
Connectors	(6) 3.5 mm 5-pole captive screw connectors (3 input, 3 loop-through)
Impedance	>10k ohms balanced/unbalanced, DC coupled
Nominal level	+4 dBu (1.23 Vrms), -10 dBV (316 mVrms)
Maximum level	+18 dBu, (balanced or unbalanced) at 1% THD+N
Input gain adjustment	-15 dBu to +15 dBu, adjustable per input

AUDIO PROCESSING

Sampling rate	48 kHz
Compression	AAC-LC MPEG-4 (ISO/IEC 14496-3:2005)
Bit rate	16 kbps to 384 kbps

AUDIO OUTPUT

Number/signal type	1 AAC-LC digital audio over Ethenet
Formats	AAC-LC MPEG-4 (ISO/IEC 14496-3:2005)

CONTROL/REMOTE — ENCODER

Serial control port	1 RS-232, 3.5 mm captive screw connector, 3 pole
Baud rate and protocol	9600 (default), 19200, 38400, 115200 baud, adjustable; 8 data bits, 1 stop bit, no parity
Program control	Extron Simple Instruction Set (SIS™) Microsoft® Internet Explorer®, Apple® Safari®*, Mozilla® Firefox®*, Google® Chrome™* (*Certain browser dependencies may apply.)

NETWORK

Ethernet data rate	10/100Base-T, half/full duplex with autodetect
Protocols	
Streaming	RTP, RTSP, unicast or multicast
Transport	TCP, UDP (unicast or multicast)
All supported	IGMP, IP, UDP, SSL, DHCP, HTTP, HTTPS, RTP, RTSP, SNMP V2 (RFC 1213)

GENERAL

Power	Internal 100-240 VAC, 50-60 Hz
Power consumption	20 watts
Temperature/humidity	Storage: -40 to +158 °F (-40 to +70 °C) / 10% to 90%, noncondensing Operating: +32 to +122 °F (0 to +50 °C) / 10% to 90%, noncondensing
Thermal dissipation	69 BTU/hr
Mounting	
Rack mount	Yes, with included brackets.
Enclosure dimensions	1.7" H x 17.5" W x 8.5" D (1U high, full rack wide) (4.3 cm H x 44.4 cm W x 21.6 cm D) (Depth excludes connectors and knobs.)
Product weight	4 lbs (1.8 kg)
Regulatory compliance	
Safety	CE, c-UL, UL
EMI/EMC	CE, C-tick, FCC Class A, ICES, VCCI
MTBF	30,000 hours
Warranty	3 years parts and labor

Model	Version Description	Part number
SME 100 HD	H.264 HD Encoder	60-1061-01
SME 100 SD	H.264 SD Encoder	60-1061-02

For complete specifications, please go to www.extron.com
Specifications are subject to change without notice.

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